**3.2 Rolle’s Theorem, MVT, and average/instantaneous rates of change**

1. In your own words, describe the conditions for the MVT to apply.

2. Compare and Contrast Rolle’s Theorem with the MVT.

3. What is the difference between average rate of change and instantaneous rate of change?

4. If you throw a ball straight upward off the top of the bleachers (32 feet) with an initial velocity of 48 fps, the position function from chapter 2 can be applied.

a. find the function that will model this flight

b. Verify (and show) the position after one second is the same as the position after two seconds.

c. According to Rolle’s theorem, what must the velocity be between one and two seconds? Find the time when that happens.

d. Find the average rate of change between one and two seconds.

e. Find the instantaneous rate of change for one and two seconds.

5. Let’s say that f(x) is a continuous function on some interval . f(x) is also differentiable between a and b. Additionally, somewhere in between, the f’(x) = 0. Does this mean that f(a)=f(b)? (This would be converse of Rolle’s theorem)

6. If a plane began its takeoff at 2pm on a 2500 mile flight and arrived at 730pm, does this mean that there ever was a time that the plane was going 400mph? Also, at least how many times (if any) must the plane be going 400mph? Explain.

7. Explain why or why not the mean value theorem can be applied to .